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Influence of Tibial Component Position on Outcome after UKR

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Introduction

Alignment and position of tibial component implantation and bearing thickness have been investigated as potential causes of pain and poor function of unicompartmental knee replacement (UKR), with significant tolerance to variation identified in tibial component angle and overhang^{1,2}.

The aim of this study was to identify the role of various surgical parameters in determining postoperative outcome.



Fig. 1. The Oxford UKR

Methods

Radiographs from 93 patients were analysed using semi-automated Active Shape Modelling, an example of the tibial fit generated shown in Fig. 2. The known size of the femoral component was used for calibration.



Fig. 2. Tibial fit of model

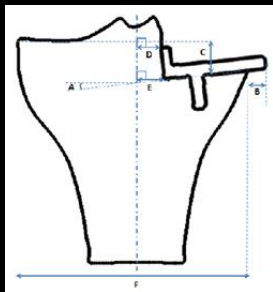


Fig. 3. Measured tibial parameters.

The parameters measured (Fig. 3) were normalised by tibial width and analysed using parametric testing, with the Pearson correlation coefficient calculated to assess the strength of correlations between them.

The Oxford Knee Score (OKS) was used to assess patient-reported outcome, with preoperative and at least 20 month postoperative scores compared to give a change in OKS, Δ OKS.

Intraclass correlation coefficients (ICCs) were generated to determine intra-observer and inter-observer reliability of the program analysis.

Results and Discussion

Intra-Observer ICCs						
Parameter	A	B	C	D	E	F
ICC	0.744	0.772	0.933	0.785	0.815	0.883
Inter-Observer ICCs						
Parameter	A	B	C	D	E	F
ICC	0.893	0.955	0.906	0.794	0.820	0.831

Fig. 4. Measured intra-observer and inter-observer ICCs for parameters A-F.

High (>0.7) ICCs for all measured parameters suggests sufficient agreement to draw reliable conclusions from the data (Fig. 4).

Only the height of the tibial cut (C) was shown to correlate with Δ OKS ($p=0.009$), such that a deeper cut was associated with a greater change in OKS (Fig. 5). However, there was no correlation with absolute post-operative OKS.

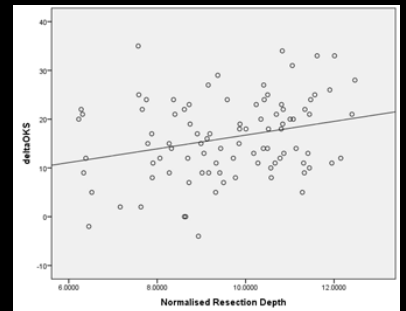


Fig. 5. Correlation between resection depth and Δ OKS.

Bearing thickness was inversely related to both resection depth ($p=0.09$) and OKS ($p=0.07$) but neither was significant.

Conclusions

The results suggest that the lower the horizontal cut relative to the lateral tibial plateau the greater the improvement in function. However, there was no significant difference between bearing thickness and outcome, with a trend towards thin bearings doing better. This suggests that it is not the amount of bone removed that improves outcome, but rather the presence of tibia vara. Previous data has shown that tibia vara does improve outcome³, so this is not a new finding, but it does confirm that tibia vara is not a contraindication for unicompartmental knee replacement.

¹ A. Gulati et al. Influence of component alignment on outcome for unicompartmental knee replacement. The Knee 16 p196-199 (2009)

² R. Chau et al. Influence of component alignment on outcome for unicompartmental knee replacement. The Knee 16 p310-313 (2009)

³ A. Gulati et al. The effect of leg alignment on the outcome of unicompartmental knee replacement. JBJS (Br) 91 p469-474 (2009)